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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,427	11/03/2003	Hideki Muto	36856.1161	1524

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EXAMINER

SUMMONS, BARBARA

ART UNIT	PAPER NUMBER
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2817

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H/A

Office Action Summary

Application No.

10/698,427

Applicant(s)

MUTO ET AL.

Examiner

Barbara Summons

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2003 (pre-amend.).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9,10,12,13 and 15-20 is/are rejected.
- 7) ☒ Claim(s) 11 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/603,252.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/3/03 & 9/20/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

The amendment to the specification inserting the Continuation parent application information must be updated by changing "currently pending" to - - now U.S. Patent No. 6,731,184 - -. Appropriate correction is required.

Claim Objections

2. Claims 10, 11, 16 and 17 are objected to because of the following informalities:

In claim 10, on line 3 thereof, "the capacitor" should be changed to - - a capacitor - - since a capacitor "provided adjacent to the antenna" has not been previously recited, but only the capacitor adjacent the reception circuit terminal has been previously recited (see claim 9, the last to lines thereof).

Similarly, in claim 11, on line 3 thereof, "the capacitor" should be changed to - - a capacitor - - since a capacitor "adjacent to the transmission circuit terminal" has not been previously recited.

For the same reasons, in claim 16, on line 3 thereof, "the capacitor" should be changed to - - a capacitor - -; and

In claim 17, on line 3 thereof, "the capacitor" should be - - a capacitor - -. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 15-20 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15, recites "a first LC filter" which is "provided between the reception circuit terminal and a capacitor provided adjacent to the reception circuit terminal" (see the last four lines of the claim). However, the location of the LC filter and the elements that comprise the LC filter are unclear because, for example, looking at Fig. 4, all of the capacitors C60 and C70 are part of the LC filter LC30 such that there is not another "capacitor provided adjacent to the reception circuit terminal". Additionally, if one considers the capacitor C70 to be the capacitor located adjacent the reception circuit terminal, then the LC filter is not "between the reception circuit terminal and" the capacitor C70, but is rather between the capacitor C70 and the switch elements. If one considers the capacitor C60 to be the capacitor adjacent the reception circuit terminal, then the LC filter is only C70 and L60, with the inductor L50 being totally separated from the LC filter. Clarification is required.

Each of claims 16 and 17 recite similarly unclear subject matter for second LC filters located either at the antenna terminal or the transmission circuit terminal. For purposes of any art rejections that follow any LC filter capable of performing the recited function (i.e. a high pass filter), will be considered to anticipate the claims.

Clarification is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 9, 12, 15 and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over either one of Erickson U.S. 5,054,114 (of record, cited by Applicants) or Todoroki et al. JP 3-32118, in view of Chigodo et al. U.S. 5,473,293 (of record, cited by Applicants).

The figure of Erickson discloses a high frequency switching component for being connected to a transmission circuit 12, a reception circuit 14 and an antenna 10, the switching component comprising: a high frequency switch including an inductor L1, a capacitor C1 and a diode SW1 and SW2 for switching between states in which either the transmission circuit or the reception circuit is connected to the antenna; a plurality of terminals including a ground terminal (shown schematically), a transmission circuit

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terminal 22 (could also be considered the node 20), a reception circuit terminal 30 (could also be considered the node above SW2) and an antenna terminal (not specifically numbered) to be connected to ground, the transmission circuit, reception circuit and antenna, respectively; and a first LC filter 24 that includes a first inductor L2, and the LC filter is a high pass filter such that it, and thus the inductor L2, inherently eliminates an electrostatic surge or discharge occurring on the signal line because it has low impedance to ground at low frequencies; and wherein the first inductor L2 is connected to the ground terminal and is provided between the reception circuit terminal 30 and a capacitor C5 provided adjacent to the reception circuit terminal 30 such that the first LC filter is also in the location recited, as far as the claims can be understood. Note that if another capacitor is required, Erickson also discloses providing a multi-stage high pass filter (see col. 3, lines 52-57). Also, because the first inductor L2 is connected to ground, the first LC filter 24 that includes the first inductor is considered "connected to ground".

Similarly, Fig. 1 of Todoroki et al. discloses a high frequency switch component for being connected to a transmission circuit (not shown), a reception circuit (not shown) and an antenna 3, the switching component comprising: a high frequency switch including an inductor L1, a capacitor C1 and a diode D1 for switching between states in which either the transmission circuit or the reception circuit is connected to the antenna; a plurality of terminals including a ground terminal (shown schematically), a transmit circuit terminal 12 (note the transmit signal E_t), a receive circuit terminal 13 (see receive signal E_r) and an antenna terminal (not numbered) to be connected to ground, the

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transmission circuit, reception circuit and antenna, respectively; and a first LC filter 2a that includes a first inductor L3, and the LC filter is a high pass filter such that it, and thus the inductor L3, inherently eliminates an electrostatic surge or discharge occurring on the signal line because it has low impedance to ground at low frequencies; and wherein the first inductor L3 is connected to the ground terminal and is provided between the reception circuit terminal 13 and a capacitor C2 provided adjacent to the reception circuit terminal 13 such that the first LC filter is also in the location recited, as far as the claims can be understood. Also, because the first inductor L3 is connected to ground, the first LC filter 2a that includes the first inductor is considered "connected to ground".

However, neither of the Erickson or Todoroki references discloses a multilayer circuit board with the plurality of terminals being disposed on the surface thereof.

Figs. 1 and 2 of Chigodo et al. disclose a multilayer antenna switch with a transmission terminal TX(52f), reception terminal RX(52j), antenna terminal ANT(52c) and ground terminal (52k)[see also grounding electrode 50 in Fig. 2G] all disposed on a surface of the multilayer circuit board. This multilayer structure provides the advantage of being small in size over alternative arrangements (see col. 2, lines 15-35).

Consequently, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the high frequency switch component of either one of Erickson or Todoroki et al., if even necessary, such that it would have been formed on a multilayer circuit board as suggested by the exemplary teaching of Chigodo et al., because each of Erickson and Todoroki et al. is silent as to the physical

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structure of its circuit, thereby suggesting to one of ordinary skill that any well known physical structure, such as on/in a multilayer circuit board, would have been usable therewith, and because such an obvious modification would have provided the advantageous benefit of a small sized switch as suggested by Chigodo et al. (see col. 2, lines 15-35).

7. Claims 10, 13, 16 and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over either Erickson/Chigodo et al. or Todoroki et al./Chigodo et al. as applied to claims 9 and 15 above, and further in view of the Fukushima et al. IEEE article "A Study of SAW Antenna Duplexer For Mobile Application" (of record, cited by Applicants).

Each of the Erickson/Chigodo and Todoroki/Chigodo combinations discloses the invention as discussed above, except for a second inductor or second LC filter located at the antenna terminal for eliminating an electrostatic surge.

Fukushima et al. discloses that it is well known to protect transmission and reception filter circuits in a duplexer from electrostatic discharge/surge entering the signal line from the antenna [see page 11, in box and Fig. 5(b)] by providing an LC high pass filter that includes an inductor connected to ground between the antenna and a capacitor located adjacent the antenna so that the surge will go to ground via the inductors (ibid.) This circuit will inherently provide elimination of an electrostatic surge with a frequency lower than the signal line from the antenna because it has low impedance to ground at low frequencies.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified either one of the Erickson/Chigodo and Todoroki/Chigodo combinations by having provided an electrostatic surge protection LC filter with an inductor connected to ground as suggested by the exemplary teaching of Fukushima et al. [see Fig. 5(b)], because such an obvious modification would have provided the advantageous benefit of protecting the switch and reception and transmission circuits from electrostatic discharge/surge from the antenna as suggested by Fukushima et al. (see page 11, in the box).

Allowable Subject Matter

8. Claims 11 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 17 and 20 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Muto et al. U.S. 6,731,184 is the U.S. Patent that issued from the parent application.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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April 19, 2006



**BARBARA SUMMONS
PRIMARY EXAMINER**